

## **Obesity and Family Planning: Reproductive Health Impacts**

**Satellite Conference  
Wednesday, June 30, 2004  
2:00-4:00 p.m. (Central Time)**

Produced by the Alabama Department of Public Health  
Video Communications Division

## **Faculty**

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## **Objectives**

- Identify the prevalence of obesity in the United States for adults and adolescents.
- Describe obesity terms and measurements.
- Discuss family planning relevance.
- Explain how smoking and obesity are limiting factors in terms of women's contraceptive choices.

## **Objectives (continued)**

- Explain how obesity contributes to hypertension, diabetes and other cardiovascular risk factors that may preclude the use of some hormonal contraceptives.
- Describe the healthcare professional's role in obesity prevention and working with obese patients.

## **Objectives (continued)**

- Identify weight loss approaches and explain nutrition management.
- Describe recommendations for client education, counseling and management.

## **Historical Perspective**

- Paleolithic era - >25,000 years ago



## Historical Perspective

- Greco-Roman times
- 19th century - Lavoisier
- Early 1900's - life insurance data



## Epidemiology of Obesity

- 31.3% of U.S. males
- 34.7% of U.S. females
- 30% increase in the last 10 years
- Health care costs - >\$100 billion/year
- Results in 300,000 preventable deaths each year in the U.S.
- 6-7% of total sick care costs in the western world due to obesity

## Classification of Overweight and Obesity (BMI)

- Underweight <18.5
- Normal range 18.5-24.9
- Overweight 25.0-29.9
- Obese 30.0

*Note: BMI = kg/m<sup>2</sup>*

## Body Mass Index

- Widely used standard for determining overweight
- Correlates more closely with body fat content than other anthropometric measurements

## Other Measurements

- Waist Circumference
  - >35 inches in women or 40 inches in men indicates hazardous fat distribution
- Waist/Hip Ratios
  - >0.8 indicates hazardous fat distribution

## What Causes Overweightness/Obesity?

- Genetics
- Nutrient and energy model of obesity
  - Metabolism
  - Appetite regulation
  - Energy expenditure
- Behavior and cultural factors

### Contributors to Weight Gain

- Demographics
- Socio-economic status
- Alcohol use
- Smoking cessation
- Hormonal
- Nutrition
- Inactivity
- Medications
- Emotions

### Hormonal Changes

- Loss of ovarian function results in:
  - Reduced resting metabolic rate
  - Reduced muscle mass
  - Increased fat mass
  - Increased accumulation of abdominal adipose tissue

### Hormonal Changes (continued)

- Decrease in testosterone results in:
  - Decreased muscle mass
  - Increased fat mass

### Nutrient and Energy Model of Obesity

- Obesity results from increased intake of energy or decreased expenditure of energy, as required by the first law of thermodynamics.

*Change in body fat = Difference between intake and expenditure.*

### Energy Expenditure

- 70% - Resting metabolic rate
- 15% - Thermogenesis
  - Food intake
  - Cold
  - Stress
- 15% - Physical activity
  - Depends on duration and intensity of physical exercise

### Metabolic Rate

- Decrease in resting metabolic rate
  - Muscle mass
  - Age
  - Sex
  - Thyroid hormones

## Genetics

- 30-40% of the variability in weight between individuals is accounted for by heredity:
  - Metabolic rate
  - Appetite and satiety
  - Thermic response to food
  - Body fat distribution
  - Predisposition to be active or inactive

## Heritability of Obesity

| <u>Types of Study</u> | <u>Heritability</u> |
|-----------------------|---------------------|
| Family Studies        | 30%-50%             |
| Adoption Studies      | 10%-30%             |
| Twins                 | 50%-90%             |

## Heritability of Obesity (continued)

Therefore, not only does current weight status have a strong inherited component, but also the metabolic processes underlying weight gain show strong genetic influences.

## Leptin

- Protein hormone produced by fat cells.
- Signals the brain about the quantity of stored fat.
- Modulates food intake.

## Leptin

- Leptin deficient mice
  - hyperphasic
  - hyperinsulinemic
  - insulin resistant
  - infertile
- Leptin administration reverses all the features of this syndrome

## The Truth About Obesity

The search for genetic factors involved in obesity should not obscure the truth that the environmental factors probably are more important.

### **Medications**

- Steroids
- Antihistamines
- Tricyclic antidepressants
- Insulin
- Lithium compounds
- Valproic acid
- Phenothiazines

### **Emotions**

- Depression
- Eating disorders

### **Metabolic Features of Obesity**

- Hyperinsulinemia - Insulin secretion is increased in direct relationship to the degree of excess fat
- Increased triglyceride secretion
  - VLDL
  - HDL
- Insulin resistance
  - Skeletal muscle
  - Fat cells
- Fatty liver may develop

### **Consequences of Obesity**

Hippocrates recognized that  
“sudden death is more common  
in those who are naturally fat  
than in lean.”

### **Cost of Obesity in the U.S.**

- Diabetes mellitus - \$32.4 billion
- Coronary heart disease - \$7.0 billion
- Osteoarthritis - \$4.3 billion
- Hypertension - \$3.2 billion
- Gallbladder disease - \$2.6 billion
- Colon cancer - \$1.0 billion
- Breast cancer - \$0.84 billion

### **Health Problems – RR>3**

- Diabetes
- Gallbladder disease
- Hypertension
- Dyslipidemia
- Insulin resistance
- Breathlessness
- Sleep apnea

### **Health Problems – RR 2-3**

- Coronary disease
- Osteoarthritis
- Hyperuricemia and gout

### **Health Problems – RR 1-2**

- Breast cancer
- Endometrial cancer
- Colon cancer
- Polycystic ovarian syndrome
- Impaired fertility
- Low back pain
- Fetal defects

### **Type 2 Diabetes**

- Risk increases with degree and duration of being overweight
- Risk increases with central distribution of body fat
- Weight gain precedes the onset of diabetes
- Type 2 diabetes is almost nonexistent with a BMI <20

### **Gallbladder Disease**

- Cholesterol production is linearly related to body fat; increased fat stores    increased cholesterol synthesis
- Increased cholesterol production    increased excretion of cholesterol in the bile    precipitation of cholesterol gallstones in the gallbladder

### **Heart Disease**

- Dyslipidemia
  - Plasma Insulin
  - Hepatic VLDL production
  - LDL cholesterol
  - LDL oxidation
  - Atherosclerosis

**Coronary Heart Disease**

### **Heart Disease (continued)**

- Visceral fat stores
- Stroke volume
- Cardiac output
- Left ventricular hypertrophy

**Congestive Heart Failure**

### **Heart Disease (continued)**

- A 100 kg woman is at the same risk for coronary artery heart disease as a woman who smokes 1 pack per day
- 40% of coronary artery disease is attributed to being overweight

### **Increased Fat Mass**

- Osteoarthritis (knees)
- Obstructive sleep apnea
  - Increased pharyngeal fat
  - Nocturnal tracheal compression

### **Regional Fat Distribution**

- Android distribution are at higher risks for diabetes and heart disease
- Central obesity – higher death rates; increased risk of heart attacks, diabetes, and some cancers

*Central obesity is measured using the ratio of the waist circumference divided by the hip circumference*

### **Criteria for Metabolic Syndrome (Syndrome X)**

Requires at least three of the following:

- Waist circumference >40 inches for men, >35 inches for women
- Triglyceride level 200 mg/dL
- HDL-C level <40 mg/dL for men, > 50 mg/dL for women

### **Criteria for Metabolic Syndrome (Syndrome X) (continued)**

- Blood pressure: systolic >130 mm HG or diastolic 85 mm Hg (or currently using blood pressure medication)
- FPG 110 mg/dL (or currently using oral hypoglycemic medication)

### **Weight Loss Benefits**

- Weight loss of only 5% to 10% has been shown to improve blood pressure, lipid levels, and glycemic controls, as well as symptoms of depression and anxiety.

**Primary goal of obesity treatment is to improve the patient's health.**

## **Contraception and Obesity**

- Oral Contraceptives
- Ortho Evra Transdermal Contraceptive Patch

### **Risk of OC Failure Retrospective Cohort Analysis According to Quartiles of Body Weight**

| Quartile           | # of Failures | Person-years OC Use | Failure/100 person-years OC Use |
|--------------------|---------------|---------------------|---------------------------------|
| 1<br><56.5 kg      | 24            | 658.5               | 3.6                             |
| 2<br>56.5-<62.5 kg | 21            | 765.2               | 2.7                             |
| 3<br>62.5-<70.5 kg | 22            | 699.9               | 2.1                             |
| 4<br>70.5 kg       | 39            | 698.2               | 5.6                             |

### **Weight and Risk of OC Failure**

- NICHD-sponsored study
- 618 OC users (2822 women-years OC use)
  - 106 confirmed pregnancies
- Women in highest body weight quartile ( 70.5 kg or 155 lbs) had significantly increased OC failure compared to women who weighed 155 lbs.

### **Weight and Risk of OC Failure (continued)**

- Findings suggest that high body weight may compromise oral contraceptive effectiveness.

Holt VL, et al.  
Obstet Gynecol 2002

### **Management Options**

- DepoProvera
- Intrauterine Devices
- Higher dose pills (e.g. 35 mcg pills)
- Add a barrier method
- Shorten the pill-free interval (no evidence to support this choice)

**Distribution of Pregnancies by  
Baseline Body Weight Deciles  
(n=3,319 subjects)**

| Decile | Weight<br>Range (kg) | Total<br>Pregnancies |
|--------|----------------------|----------------------|
| 1      | <52                  | 1                    |
| 2      | 52 - <55             | 2                    |
| 3      | 55 - <58             | 0                    |
| 4      | 58 - <60             | 0                    |
| 5      | 60 - <63             | 2                    |

**Distribution of Pregnancies by  
Baseline Body Weight Deciles  
(n=3,319 subjects)**

| Decile | Weight<br>Range (kg) | Total<br>Pregnancies |
|--------|----------------------|----------------------|
| 6      | 63 - <66             | 0                    |
| 7      | 66 - <69             | 1                    |
| 8      | 69 - <74             | 0                    |
| 9      | 74 - <80             | 2                    |

**Distribution of Pregnancies by  
Baseline Body Weight Deciles  
(n=3,319 subjects)**

| Decile | Weight<br>Range (kg) | Total<br>Pregnancies |
|--------|----------------------|----------------------|
| 10     | 80                   | 7                    |
|        | 80 - 85              | 1                    |
|        | 85 - 90              | 1                    |
|        | ≥ 90                 | 5                    |

Zieman et al., *Fertil Steril* 2001; vol. 76:S19 (abst O-48)

**Treatment –  
Identify the Etiology**

- Neuroendocrine disorders may be associated with the development of obesity:
  - Hypothalamic disorders
  - Cushing's Syndrome
  - Polycystic Ovary Syndrome

**Treatment –  
Identify the Etiology**

- Certain drugs increase body weight
- Cessation of smoking
- Sedentary lifestyle



"What fits your busy schedule better, exercising one hour a day or being dead 24 hours a day?"

## Treatment – Identify the Etiology

- Dietary factors:
  - Over eating – portion size
  - Frequency of eating
  - Dietary fat intake
  - Night-eating
  - Binge-eating
- Socioeconomic and ethnic factors



## Questions to Ask:

- Previous weight-loss attempts
- Weight at age 20 and one year ago
- Family history of obesity
- Whether the patient's significant other or family members are overweight
- Frequency of "fast food" and restaurant meals
- Who does the shopping and cooking?

## Questions to Ask: (continued)

- Food cravings
- Impact of emotional states on eating habits
- Usual levels of energy and activity level
- Desired health goals besides weight loss

## Treatment

- Rules of thumb:
  - Avoid crash diets
  - Establish patient's readiness to make changes
  - Establish realistic goals for weight loss

*A realistic goal is usually a loss of 5% to 15% from baseline*

## Treatment (continued)

- Increased physical activity
- Good dietary practices



**The Following Questions Should Be Asked About Any Diet the Clinician or Patient Wants To Use:**

- Does the diet have adequate protein?
- Does the diet reduce the intake of saturated fat and cholesterol?
- Does the diet provide adequate amounts of carbohydrates and starches?

**The Following Questions Should Be Asked About Any Diet the Clinician or Patient Wants To Use:**  
(continued)

- Does the diet emphasize fruits and vegetables?
- Does the diet recommend reducing sugar and alcohol?

**Principles for Dieting**

- Select an energy intake below maintenance levels to provide a desired rate of weight loss
- Select a diet that has more than 75 g/d of high-quality protein
- Provide adequate carbohydrate (complex) intake
- Reduce the intake of foods with high levels of saturated fats

**Principles for Dieting**  
(continued)

- Eat no fewer than 3 meals and preferably five or more meals a day, including breakfast
- Select a variety of foods, include high fiber foods, with a preference for fresh fruits and vegetables, as well as cereals and whole-grain products
- Women should consume at least 1,200 kcal/d; men, 1,500 kcal/d

**Principles for Dieting**  
(continued)

- Supplement the diet with multivitamins and minerals
- Avoid alcoholic beverages
- Limit the use of fat spreads
- Avoid sugar-containing beverages

**Treatment**

- Behavior strategies
  - Self-monitoring of food intake (food diary)
  - Slowing the pace of eating
  - Self-help groups for weight control
    - Weight Watchers International
    - Overeaters Anonymous
    - TOPS
  - Psychoanalysis

### **Weight Watchers®**

- **Program Content:**
  - Foods are awarded different points
  - Individuals are budgeted an average of 18-35 points a day
  - Allowed to use points according to individual tastes and preferences

### **Weight Watchers® (continued)**

- **Program Content:**
  - Points are tracked in daily food journals
  - Regular meetings are provided (online participation is also available)

### **Weight Watchers® (continued)**

- **Cost:** \$13.00 registration fee; \$12.00 weekly fee
- **Efficacy - at 5 years:**
  - 19.4% were within 5 pounds of goal weight
  - 42.6% maintained a loss of 5% of their body weight or more

### **Weight Watchers® (continued)**

- 18.8% maintained a loss of 10% of their body weight or more
- 70.3% were below initial weight

- **Website:**  
[www.weightwatchers.com](http://www.weightwatchers.com)

### **Jenny Craig ®**

- **Program Content:**
  - 20-minute one-on-one consultation
  - Exercise support with walking audiotapes
  - Weekly sessions that emphasize an active lifestyle and healthy relationship with food

### **Jenny Craig ® (continued)**

- **Program Content:**
  - Menus are designed with pre-prepared meals that are low in calories, fat, and cholesterol and high in fiber.
  - Transition of pre-prepared foods to self-directed, healthy meal preparations using dietary exchanges.

### **Jenny Craig ® (continued)**

- **Diet Composition:**
  - 60% carbohydrate
  - 20% fat
  - 20% protein
  - Total calories: 1,200-2,200/day

### **Jenny Craig ® (continued)**

- **Costs:**
  - Start up fees/consultation fees are between \$200.00 and \$370.00
  - Prepared meals average \$65.00 per week
- **Efficacy:** No official data/outcomes statistics have been published
- **Website:** [www.jennycraig.com](http://www.jennycraig.com)

### **TOPS Club Inc. ®**

- **Program Content:**
  - Weekly meetings – weigh-ins and discussions
  - Motivational competitions/contests to encourage success

### **TOPS Club Inc. ® (continued)**

- **Diet composition:** No official diet; however, diet education is based on diabetic exchange system
- **Cost:** \$20.00/year
- **Efficacy:** No official data/outcome statistics have been published

### **Overeaters Anonymous, Inc.**

- **Program Content:**
  - Patterned after the 12 steps of Alcoholics Anonymous
  - Attempts to address the emotional, spiritual, and physical aspects of overeating
- **Diet composition:** No official diet
- **Cost:** No fee
- **Efficacy:** No official data/outcome statistics have been published

### **Nutrisystem.com ®**

- **Program Content:**
  - Online weight management program
  - Internet counselors
  - Personalized exercise programs
  - Food journals
  - Chat rooms for support
  - Designed to incorporate pre-prepared mail-ordered foods (not mandatory)

### **Nutrisystem.com ® (continued)**

- Diet composition:
  - 60% carbohydrates
  - 20% protein
  - 20% fat
- Costs:
  - Approximately \$50/week for food
- Efficacy: No official data/outcome statistics have been published

### **The Atkins Diet**

- Central concepts:
  - Carbohydrates stimulate insulin secretion, which in turn stimulates appetite
  - When severely restricting carbohydrate in the diet, the individual can continue to eat good-tasting foods, experience little or no hunger, and lose weight more rapidly than they would on a lower fat diet

### **The Atkins Diet (continued)**

- The Diet:
  - Induction phase – total daily intake of carbohydrates is limited to 20 g/day
  - Maintenance phase – 40 g/day
  - No need to count calories, although, the induction diet is roughly 1200 kcal/day

### **The Atkins Diet (continued)**

- The Data:
  - There is very little research on either the effectiveness or risks of this diet

### **The Atkins Diet (continued)**

- One multicenter, randomized, controlled trial compared participants randomized to either Atkins Diet (n=33) or a Conventional Diet program (n=30) over a period of 52 weeks

### **The Atkins Diet (continued)**

- Conclusions:
  - The Atkins Diet was associated with more favorable effects on weight, HDL, and triglycerides than a conventional high carbohydrate diet
  - The conventional high carbohydrate diet was associated with more favorable effects on total and LDL cholesterol at week 12 but not at weeks 26 and 52

### **The Atkins Diet (continued)**

**–Conclusions:**

- The Atkins diet merits further investigation in longer term trials with more comprehensive assessments

### **The Atkins Diet (continued)**

• **Concerns:**

- Long-term health effects of high intakes of saturated fat
- Individuals may not be able to sustain this diet over a period of many years

### **The Atkins Diet (continued)**

- Recent review of the National Weight Control Registry suggests that very few people who have succeeded in maintaining weight loss long term are using the Atkins program

**“Eat slowly:  
Only men in rags  
And gluttons old in sin  
Mistake themselves for  
carpet bags  
And shovel victuals in.”**

**- Sir Walter Raleigh**

### **Behavior Predictors of Successful Weight Loss**

- Positive feelings
- Internal motivation
- Focusing on positive changes in health, fitness and appearance
- Social support

### **Pharmaceutical Treatment**

**Obese patients who take weight loss medications may lose 5 to 20 pounds more than they would from lifestyle changes alone**

### **Drug that Reduces Food Intake:**

- Serotonin-Norepinephrine Reuptake Inhibitor – Sibutramine (Meridia)
    - Initial dose: 10 mg/day
    - Maximum dose: 20 mg/day
- Significant adverse effects: hypertension and tachycardia; patients with cardiovascular conditions should not take sibutramine

### **Drug that Alters Metabolism:**

- Orlistat (Xenical)
    - Reduces the absorption of dietary fat
    - 120 mg. TID
- Adverse effects are mainly gastrointestinal, including loose stools and oily spotting

### **Surgical Treatment**

- Malabsorptive operation (Roux-en-Y Gastric Bypass)
- Altered size of gastric pouch (Lap-Band Procedure)
- Removal of excess skin and fat



### **Criteria for Surgical Intervention**

- BMI >40 or >35 with 2 comorbid conditions
- Failure of nonsurgical methods
- Presence of 2 or more medical conditions that would benefit by weight loss

. . . Leave gourmandizing,  
Know the grave doth gape for thee  
Thrice wider than for other men.

- Shakespeare  
*Henry IV*  
Act V, Scene 5

### **Upcoming Programs**

**Lives on the Line:  
Every Minute Counts!  
Wednesday, July 14, 2004  
2:00-4:00 p.m. (Central Time)**

**South Central Center for  
Public Health Preparedness  
(Topic to be announced)  
Tuesday, July 20, 2004  
12:00-1:30 p.m. (Central Time)**

### **Upcoming Programs**

**Parkinson's Disease  
(Home Health Aides & Attendants)  
Wednesday, July 21, 2004  
2:00-4:00 p.m. (Central Time)**

**For a complete listing of  
upcoming programs,  
visit our website:  
[www.adph.org/alphtn](http://www.adph.org/alphtn)**